Canadian Centre for Occupational Health and Safety

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HOW TO WORK SAFELY WITH FLAMMABLE AND COMBUSTIBLE LIQUIDS

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HOW TO WORK SAFELY WITH FLAMMABLE AND COMBUSTIBLE LIQUIDS

This publication was prepared as a source of information for health and safety committees and others with an interest in understanding and reducing the occupational hazards of flammable and combustible liquids.

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1. INTRODUCTION

Flammable and combustible liquids are present in almost every workplace. Fuels and many common products like solvents, thinners, cleaners, adhesives, paints, waxes and polishes may be flammable or combustible liquids. Everyone who works with these liquids must be aware of their hazards and how to work safely with them.

This publication provides general advice on how to work safely with flammable and combustible liquids. It is intended for workplaces where these liquids are present in containers of 250 litres (55 gallons) or less. It does not cover bulk storage tanks, piping systems, or specific processes using flammable or combustible liquids.

The advice in this guide should be used for all flammable liquids. It also applies to combustible liquids that are stored, handled or used at temperatures near (within 17°C or 30°F) or above their flashpoints.

Occupational health and safety regulations and fire and building codes cover flammable and combustible liquids in most workplaces, including industrial plants, laboratories, schools, mines, stores, offices and construction projects. They describe the legal requirements that apply to the storage, handling and use of these liquids. Regulations can vary depending on the type of workplace and the community where the workplace is located. Contact your local fire department and occupational health and safety officials in the jurisdiction where you work for details.

Read the container label and the Material Safety Data Sheet (MSDS) before you start to work with a hazardous material. You can obtain the MSDS directly from the material's manufacturer or supplier, or from CCOHS.

2. WHAT ARE FLAMMABLE AND COMBUSTIBLE LIQUIDS?

Flammable and combustible liquids are liquids that can burn. They are classified by their flashpoints.

Flashpoint

The flashpoint of a liquid is the lowest temperature at which the liquid gives off enough vapour to be ignited at the surface of the liquid.

There are several specific technical criteria and test methods for identifying flammable and combustible liquids. Under the Workplace Hazardous Materials Information System (WHMIS):

- flammable liquids have a flashpoint below 37.8°C (100°F).
- combustible liquids have a flashpoint at or above 37.8°C (100°F) and below 93.3°C (200°F).

Flammable and combustible liquids themselves do not burn. It is the mixture of their vapours and air that burns.

Gasoline, with a flashpoint of -40°C (-40°F), is a flammable liquid. Even at temperatures as low as -40°C (-40°F), it gives off enough vapour to form a burnable mixture in air. Phenol is a combustible liquid. It has a flashpoint of 79°C (175°F), so it must be heated above that temperature before it can be ignited in air.

Flammable or Explosive Limits

A material's flammable or explosive limits also relate to its fire and explosion hazards. These limits give the range between the lowest and highest concentrations of vapour in air that will burn or explode.

The lower flammable limit or lower explosive limit (LFL or LEL) of gasoline is 1.4 percent; the upper flammable limit or upper explosive limit (UFL or UEL) is 7.6 percent. This means that gasoline can be ignited when it is in the air at levels between 1.4 and 7.6 percent. A concentration of gasoline vapour in air below 1.4 percent is too "lean" to burn. Gasoline vapour levels above 7.6 percent are too "rich" to burn.

Autoignition Temperature

A material's autoignition or ignition temperature is the temperature at which a material self-ignites without any obvious sources of ignition, such as a spark or flame. Most common flammable and combustible liquids have autoignition temperatures in the range of 300°C (572°F) to 550°C (1022°F). Some have very low autoignition temperatures. For example, ethyl ether has an autoignition temperature of 160°C (356°F) and its vapours have been ignited by hot steam pipes. Serious accidents have resulted when solvent-evaporating ovens were heated to temperatures above the autoignition temperature of the solvents used.

The MSDS for a flammable or combustible liquid should give its flashpoint, lower and upper flammable or explosive limits, and autoignition temperature. These values can be very approximate because of differences in such things as testing methods and purity of the liquid tested. Use them only as guides, not as fine lines between safe and unsafe.

Normally, labels on containers of flammable and combustible liquids will have the hazard symbol shown in Figure 1. If you encounter an unknown liquid, treat it as very hazardous until you find out exactly what it is.

Figure 1 - Workplace Hazardous Materials Information System (WHMIS) hazard symbol for flammable and combustible materials

3. HOW ARE FLAMMABLE AND COMBUSTIBLE LIQUIDS HAZARDOUS?

Fire and Explosion Hazards

At normal room temperatures, flammable liquids can give off enough vapour to form burnable mixtures with air. As a result, they can be a serious fire hazard.

Combustible liquids at temperatures above their flashpoint also release enough vapour to form burnable mixtures with air. Hot combustible liquids can be as serious a fire hazard as flammable liquids.

Spray mists of flammable and combustible liquids in air may burn at any temperature if an ignition source is present.

The vapours of flammable and combustible liquids are usually invisible. They can be hard to detect unless special instruments are used.

Flammable liquid fires burn very fast. They also give off a lot of heat and often clouds of thick, black, toxic smoke.

Most flammable and combustible liquids flow easily. A small spill can cover a large area of workbench or floor. Burning liquids can flow under doors, down stairs and even into neighbouring buildings, spreading fire widely.

Materials like wood, cardboard and cloth can easily absorb flammable and combustible liquids. Even after a spill has been cleaned up, a dangerous amount of liquid could still remain in surrounding materials or clothing, giving off hazardous vapours.

Flash-Back

Vapours can flow from open liquid containers. The vapours from nearly all flammable and combustible liquids are heavier than air. If ventilation is inadequate, these vapours can settle and collect in low areas like sumps, sewers, pits, trenches and basements. The vapour trail can spread far from the liquid. If this vapour trail contacts an ignition source, the fire produced can flash back to the liquid. Flash-back and fire can happen even if the liquid giving off the vapour and the ignition source are hundreds of feet or several floors apart.

Other Hazards

Flammable and combustible liquids can also cause health problems depending on the specific material and route of exposure (breathing the vapour/mist, eye or skin contact, or swallowing).

Some flammable and combustible liquids are corrosive. Many undergo dangerous chemical reactions if they contact incompatible chemicals such as oxidizing materials, or if they are stored improperly.

The MSDSs and the supplier's labels on the containers should tell you about all the hazards for the flammable and combustible liquids that you work with.

4. HOW CAN YOU WORK SAFELY WITH FLAMMABLE AND COMBUSTIBLE LIQUIDS?

Substitute a Less Hazardous Material Where Possible

Substitution can be the best way to avoid or reduce a hazard. Often, though, it is not easy or even possible to find a non-flammable or less flammable substitute to do the job effectively and safely. Start by obtaining MSDSs for all possible substitute materials. Find out about all the hazards (fire, health, chemical reactivity) of these materials before making any changes.

Choose the least hazardous materials that can do the job effectively and safely. Learn how to work safely with them, too.

Avoid or Eliminate Ignition Sources

For a flammable or combustible liquid fire to start, a mixture of vapour and air must be ignited. There are many possible ignition sources:

- Sparks from electrical tools and equipment.
- Tobacco smoking.
- Open flames from portable torches and heating units, boilers, pilot lights, ovens, and driers.
- Hot surfaces such as boilers, furnaces, steam pipes, electric lamps, hot plates, irons, hot ducts and flues, electric coils and hot bearings.
- Sparks, arcs and hot metal surfaces from welding and cutting.
- Embers and sparks from incinerators, foundry cupolas, fireboxes and furnaces.
- Sparks from grinding and crushing operations.
- Sparks caused by static electricity from rotating belts, mixing operations or improper transfer of flammable or hot combustible liquids.
- Spontaneous combustion. The oils in some wastes and rubbish can slowly react with oxygen in the air. This reaction creates heat that can build up over time, if the wastes are left undisturbed. When the heat level is high enough (autoignition temperature), the vapours ignite, causing a fire.

You can eliminate many of these ignition sources by:

- removing open flames and spark-producing equipment.
- not smoking around these liquids.
- using approved explosion-proof equipment in hazardous areas.

Other steps to avoid or eliminate ignition sources are discussed in detail later.

Use Good Ventilation Wherever Flammable and Combustible Liquids Are Present

Well-designed and -maintained ventilation systems remove flammable vapours from the workplace and reduce the risk of fire and health problems.

The amount and type of ventilation needed to minimize the hazards of flammable and combustible liquid vapours depend on such things as the kind of job, the kind and amount of materials used, and the size and layout of the work area.

An assessment of the specific ways flammable and combustible liquids are stored, handled, used and disposed of is the best way to find out if existing ventilation controls (and other hazard control methods) are adequate.

Some workplaces may need a complete system of hoods and ducts to provide acceptable ventilation. Others may require a single, well-placed exhaust fan. Use non-ferrous fan blades and shrouds, and explosion-proof electrical equipment in ventilation systems for these liquids. Exhaust openings near floor level may be necessary to remove heavier-than-air vapours.

If the ventilation keeps vapour levels below a chemical's occupational exposure limit, usually there is little risk of fire or explosion. This is because vapour levels harmful to people are, in most cases, much below the smallest amount of vapour in air that can burn. For example, toluene has a workplace exposure limit of 100 ppm [100 parts of toluene per million parts of air (.01 percent)] (ACGIH 1987-1988) in many jurisdictions. This is far below the LFL for toluene, which is 12 000 ppm (1.2 percent).

In baking and drying ovens, enclosed air-drying spaces, ventilation duct work or other enclosures where workers are not normally exposed to the vapour, keep vapour levels to 20 percent or less of the LFL.

Store Flammable and Combustible Liquid Containers Properly

Store flammable and combustible liquids according to the laws that apply to a particular workplace. These specify the kinds of storage areas, such as storage rooms and cabinets, allowed for these liquids. They also specify how to construct these storage areas and the amounts of flammable and combustible liquids in different types of containers that you can store in each kind of storage area.

In all cases, allow only trained, authorized people into storage areas.

Before storing, inspect all incoming containers to ensure that they are undamaged and properly labelled. Do not accept delivery of defective containers.

In general, store containers of flammable and combustible liquids separately, away from process and production areas, and other materials. This will reduce the spread of any fire to other materials in storage. It will also protect the stored flammable and combustible liquids from exposure to fires in other areas, and accidental contact with incompatible materials. Keep containers closed when not in use.

Flammable vapours tend to accumulate in low areas. Because of this, avoid storing flammable and combustible liquids in basements. Ground floor storage is usually preferred.

Store flammable and combustible liquids in areas which are:

- well ventilated to minimize vapour concentrations.
- free of ignition sources.

- cool and dry.
- supplied with adequate firefighting and spill clean-up equipment.
- away from elevators, building and room exits, or main aisles leading to exits.
- accessible by firefighters.
- labelled with suitable warning signs.

It may be possible to store small amounts of flammable liquids [less than 235 litres (51 gallons)] and combustible liquids [less than 470 litres (103 gallons)] in approved portable containers in specially designed storage cabinets near their point of use.

Sometimes, flammable liquids are stored in refrigerators. Use specially designed and approved refrigerators (generally described as "laboratory safe") for this. Standard domestic refrigerators contain many ignition sources and should not be used.

Keep the amount of materials in storage as small as possible. It is a good practice to keep no more than one day's supply of flammable and combustible liquids in the immediate work area. Return any leftover material to the proper storeroom or storage cabinet at the end of the day.

Inspect storage areas regularly for any deficiencies such as damaged or leaking containers, poor ventilation or non-approved equipment. Unapproved modifications or damage to approved or explosion-proof equipment or systems could result in unintended hazardous conditions. Correct all deficiencies as soon as possible.

Handle Drums Safely

Many workplaces receive flammable liquids in large metal drums or barrels, then fill smaller containers from them.

Moving full drums weighing hundreds of pounds by hand can be difficult and hazardous. Specially designed drum cradles are available for moving drums around and can also be used as individual drum storage racks.

Venting

Drums of flammable liquids should have pressure- and vacuum-relief venting installed. Normally, this is done as soon as the drum is opened for dispensing. If a stored drum will be exposed to heat sources or large temperature changes, relief venting may be needed.

Storing a full drum in direct sunlight or near other heat sources can increase vapour levels in the drum. This leads to an increase in pressure which could, in extreme cases, cause the drum to rupture. A build-up in pressure can also result in vapour shooting out into the face or onto the clothing of the person opening the drum. A pressure-relief vent prevents this increase in pressure.

Vacuum-relief vents are also useful. If a drum of flammable liquid is subjected to sudden cooling, a partial vacuum can form inside it. This could, in extreme cases, cause the drum to collapse and leak. Also, for proper dispensing of liquids, the space left behind by the liquid in the drum must be replaced with air so that no vacuum forms.

There are different kinds of pressure-relief and vacuum-relief devices, including combination types, available from safety equipment retailers.

Bond and Ground Containers

Electric charges can build up on an object or liquid when it moves through a pipe or machine. This build-up is called static electricity. Static electricity is what causes the sparks when you comb your hair or touch a metal object, like a doorknob, after walking across a carpet on a cold, dry day. Static electricity is a possible fire or explosion hazard when it sparks in the presence of a flammable vapour/air mixture.

Transferring a liquid from one metal container to another may result in static electrical sparks. It is important to bond metal dispensing and receiving containers together before pouring. Bonding is done by making an electrical path from one metal container to the other. The best way to do this is to securely attach a special metal bonding strap or wire to both containers. Some liquid transfer pumps have self-bonding hoses. Bonding can also be done by keeping a solid metal-to-metal contact between the containers themselves. This method is usually not reliable because a good electrical contact is often hard to make and maintain during the entire transfer.

You only need to bond those containers which conduct electricity, such as those made from metal. You need not bond containers if one is made from a material which conducts electricity poorly, such as polyethylene plastic or glass.

In the flammable liquid storage and dispensing area, ground dispensing drums. Grounding is done by connecting the container to an already grounded object which will conduct electricity. This could be a buried metal plate, a metallic underground gas piping system, metal water pipes or grounded metal building framework.

Bonding both containers and grounding one of them "drains off" static charges and prevents the discharge of sparks (see Figure 2). All grounding and bonding connections must be bare metal to bare metal. Remove all dirt, paint, rust or corrosion from points of contact. Specially designed and approved bonding and grounding wire assemblies are available from safety equipment retailers.

Bonding and grounding are needed when dispensing flammable or hot combustible liquids from storage drums to smaller electrically conductive containers. Similarly, whenever you transfer these liquids between conductive containers in any work areas, for example, when filling or draining dip tanks, mixers, rinse tanks or other equipment, bond both containers together and ground one of them. Check bonding and grounding connections regularly to ensure they are in good condition.

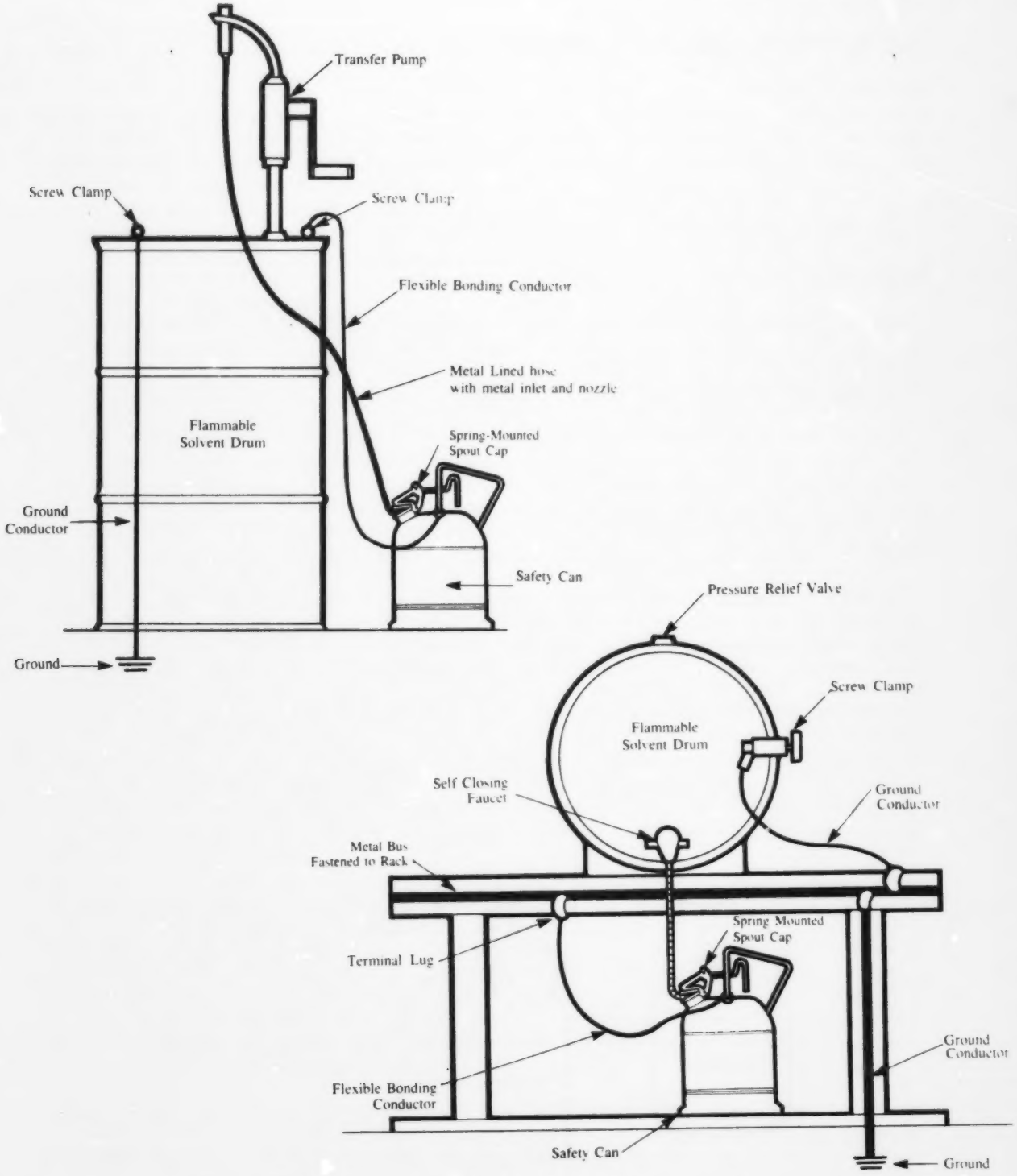

Figure 2 - Bonding and grounding are essential for the safe handling of flammable and combustible liquids

Use Approved, Labelled Containers

Whenever possible, use approved, properly labelled safety containers when working with flammable and combustible liquids. "Approved" containers are containers that have been approved by testing laboratories acceptable to government enforcement agencies. These laboratories include Underwriters Laboratories of Canada (ULC), Canadian Standards Association (CSA) and Factory Mutual Research (FM). There are many different kinds of approved containers available from safety equipment retailers.

Safety Cans

Portable safety cans for carrying, storing and dispensing flammable and combustible liquids are widely used. They are available in different shapes and in capacities from .5 to 25 litres. Approved safety cans are made from metal or very low conductivity plastic.

Safety cans have spring-mounted spout caps. These automatically open when the vapour pressure builds up inside, to allow vapours to escape and prevent rupture (or explosion, in the event of fire). The cap-operating mechanisms also cause the spout cap to close automatically when you finish filling or pouring from the safety can, or if the can is dropped (see Figure 3).

This safety feature could create a hazard under some conditions. In a warm enclosed space, such as a car trunk, vapours venting from a safety can might reach flammable levels. A spark could cause an explosion. For temporary transport of small amounts (normally less than 25 litres) of flammable liquid, use an approved pressure-resistant and non-venting container. Eliminate ignition sources and ensure good ventilation, too.

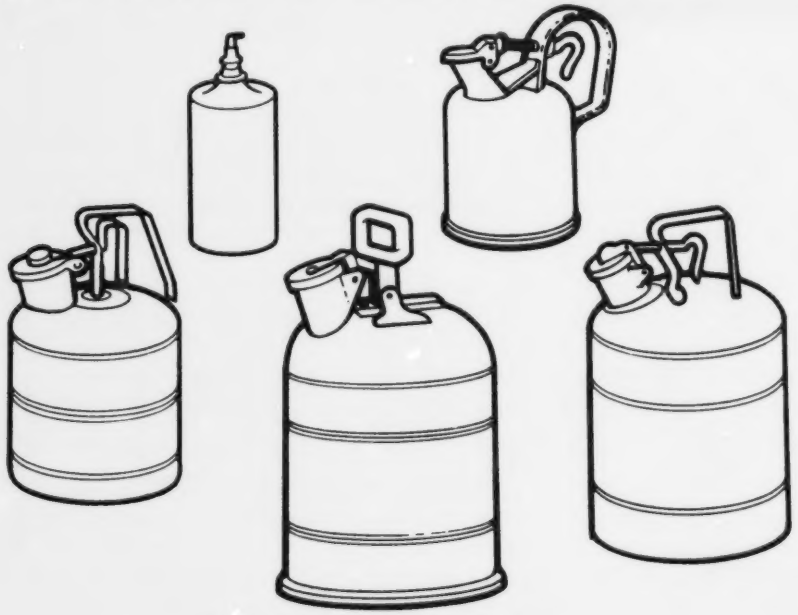

Figure 3 - Typical safety cans

Safety cans may also have wire mesh flame arrester screens inside the cap spouts. These prevent flash-backs from reaching the liquid in the cans.

Other Approved Containers

Other types of approved containers include:

- rinse and cleaning tanks for dipping or washing parts in liquid.
- plunger cans for moistening cleaning rags.
- bench cans for dipping and rinsing small parts.
- dispenser or "benzine" cans for dispensing small amounts of liquid directly on work or cloths.
- containers for disposal of flammable and combustible liquids and oily rags and waste.

These approved safety containers also have different kinds of safety devices, such as self-closing lids or flame arresters. Containers like some rinse or dip tanks, or oily rag and waste cans with lids that are not self-closing are held open by fusible link devices. In the event of a fire in an open container, the fusible link melts, closing the lid and smothering the fire.

In certain cases, flammable and combustible liquids may be stored, handled and used in approved, non-reusable glass or plastic containers (usually the ones they are shipped in), holding no more than 4.6 litres (1 gallon). This may be acceptable if the required liquid purity (such as ACS analytical reagent grade or higher) is affected by storage in metal containers, or if the liquid causes excessive corrosion of metal containers.

Container Inspection

Check all containers used for flammable and combustible liquids regularly to make sure that they are not damaged, that spring-operated mechanisms are working properly and that flame arresters are not broken. Safety container manufacturers will provide detailed ways to inspect their equipment for safe operation.

Container Labelling

Properly label all containers used for flammable and combustible liquids. This helps prevent accidentally mixing one chemical with another and reduces the chances of mistaking one liquid for another. Plainly mark the name of the liquid and its hazard on the container. Keep the label clean so that it can be easily seen at all times. Never use a container for any liquid except the one that is marked on the label.

Using unsuitable containers such as jam jars, saucers, open cans, buckets or pails is a dangerous practice. Open containers allow hazardous vapours to escape. Breakable containers increase the chance of serious spills.

Dispense Flammable and Combustible Liquids Carefully

Take care when dispensing or transferring flammable and combustible liquids from one container to another. Dispense from only one container at a

time. Finish dispensing one material before starting to dispense another. Be sure containers are closed after dispensing to control hazardous vapours and to avoid accidental spills.

Approved transfer pumps and drum faucets that cannot be left running accidentally are available. Check these devices periodically to be sure that they work properly and do not leak.

Use an approved safety drip can below each drum faucet to catch spills or drips from worn or damaged faucets.

Never dispense flammable and combustible liquids near ignition sources. Always make sure that metal containers are bonded and grounded when dispensing.

Never transfer liquids by pressurizing their usual shipping containers with air. The pressure may damage ordinary drums and barrels, or create a flammable atmosphere inside the containers.

Mark dispensing areas with suitable warning signs.

Dispose of Waste Material Safely

Collect, transfer and store waste flammable and combustible liquids in the same way as unused liquids. Clean, standard metal drums can be used to store waste liquids if they are vented, grounded and bonded similarly to dispensing drums. Approved safety disposal cans are also available for waste liquids.

Place cloth, paper and other solid materials that are soaked with flammable and combustible liquids in approved oily waste disposal cans. These are made of metal and have self-closing lids. Do not overfill them, and empty them at least at the end of every workday to reduce the chance of spontaneous combustion.

Clearly label all waste containers with their contents.

Be careful with "empty" flammable and combustible liquid containers. They may contain enough liquid to create an explosion hazard. Only about 14 mL (.5 fluid ounce) of liquid are needed to give enough vapour to form an explosive atmosphere in a 182-litre (40-gallon) drum. This amount can easily be trapped in a seam or be present as a very thin film on the inner surface of the drum. Do not perform any work (welding, cutting, drilling, soldering) on an "empty" liquid container until all liquid and vapours have been cleaned out. Contact the chemical manufacturer or supplier for the best way to do this.

Never pour waste liquids down sinks or drains that connect to sanitary or storm sewers. Dispose of them by burning in a suitable incinerator, or through hazardous waste collection and disposal companies. In all cases, dispose of these wastes according to the environmental laws that apply to your jurisdiction. Contact the appropriate environmental officials for details of the disposal laws covering the materials you work with.

Practice Good Housekeeping and Equipment Maintenance

Good housekeeping and equipment maintenance are important wherever any chemicals, including flammable and combustible liquids, are used.

- Keep all areas where these liquids are stored, handled or used clear of burnable materials.
- Provide drip trays and empty them often wherever recurring leakages occur.
- Consider using splash guards to enclose machines or processes that eject flammable or combustible liquids.
- Clean up liquid spills immediately.
- Remove any obstructions that prevent containers with lids held open by fusible links from closing fully.
- Make sure that flammable and combustible liquids are not left where they could block or otherwise prevent people from escaping in case of a fire.

Regular equipment inspection and maintenance is important for controlling the hazards of flammable and combustible liquids.

- Ensure maintenance personnel know the possible hazards of the materials they might be exposed to.
- Carry out repairs to equipment properly, including special equipment like explosion-proof fittings. Fires and explosions have resulted from the addition of non-approved parts or equipment to approved systems.
- Do not use safety containers that are damaged in any way. If repairs using approved parts cannot restore safety containers to a safe condition, discard the containers once they have been properly cleaned.

Wear Proper Personal Protective Equipment

If other methods, such as engineering controls, are not available or effective in controlling exposure to toxic materials, wear suitable personal protective equipment (PPE).

Choosing the right PPE to wear when doing a particular job is essential. MSDSs should provide general guidance. Selecting PPE for a specific job is best done with the help of someone who knows how to evaluate the hazards of the job and how to select the proper PPE.

Know and be familiar with the right PPE for emergencies, as well as normal operations.

You must wear the PPE necessary for the job you are doing. PPE cannot protect you if you are not wearing it.

Avoid Skin Contact With the Liquid

In most cases, wear protective gloves, aprons, boots, hoods or other clothing, depending on how much chance there is of skin contact. This clothing must be made of materials that resist penetration or damage by the chemical. The MSDS should recommend appropriate materials. If it does not, contact the chemical manufacturer or supplier for specific information.

Protect Your Eyes and Face

Always wear eye protection when working with these liquids. Although ordinary safety glasses provide some protection, chemical safety goggles are best. In some cases, you should also wear a face shield to protect your face from splashes. The current Canadian Standards Association (CSA) Standard Z94.3, "Industrial Eye and Face Protectors," provides advice on selection and use of eye and face protectors.

Avoid Breathing Vapours or Mists of These Liquids

If respirators must be used for breathing protection, there should be a written respiratory protection program to follow. Guidance for developing a program can be found in the current CSA Standard Z94.4, "Selection, Care, and Use of Respirators." Follow all legal requirements for respirator use and approvals. These may vary between jurisdictions in Canada.

Be Ready to Handle Emergencies Safely

In emergencies like chemical fires and spills, act fast.

- Evacuate the area at once if you are not trained to handle the problem or if it is clearly beyond your control.
- Alert other people in the area to the emergency.
- Call the fire department immediately.
- Report the problem to the people responsible for handling emergencies where you work.
- Obtain first aid if you have been exposed to harmful chemicals and remove all contaminated clothes. Emergency eyewash stations and safety showers should be present wherever accidental exposure to materials that can damage skin or eyes might occur.

Only specially trained people, equipped with the proper tools and protective equipment, should handle the emergency. Nobody else should go near the area until it is declared safe.

Planning, training and practicing for emergencies are important so that everyone knows what they must do.

The MSDSs for the materials you are using are a good starting point for drawing up an emergency plan. MSDSs have specific sections on fire and explosion hazards including suitable fire extinguishing equipment and

methods (using the wrong fire extinguisher or using it incorrectly is dangerous), spill clean-up procedures, and first aid instructions. If the directions in each MSDS section are not clear or seem incomplete, contact the material's manufacturer or supplier for help.

You can obtain help in developing emergency plans from many other sources too. Local fire departments can assist with fire emergency plans and training. Occupational health and safety and environmental enforcement agencies, provincial safety associations, St. John Ambulance, insurance carriers, professional societies in occupational health and safety, labour unions, trade associations, some local colleges and universities, and CCOHS can supply useful information at little or no cost. Specialized private consultants are also available.

5. BASIC SAFE PRACTICES

Following these basic safe practices will help protect you from the hazards of flammable and combustible liquids:

- Obtain and read the Material Safety Data Sheets (MSDSs) for all of the materials you work with.
- Be aware of all of the hazards (fire/explosion, health, chemical reactivity) of the materials you work with.
- Know which of the materials that you work with are flammable or combustible liquids.
- Avoid or eliminate ignition sources (sparks, smoking, flames, hot surfaces) when working with flammable and combustible liquids.
- Store, handle and use flammable and combustible liquids in well-ventilated areas.
- Use approved equipment, including labelled safety containers, for flammable and combustible liquids.
- Keep containers closed when not in use.
- Bond and ground metal containers when transferring flammable and combustible liquids.
- Practice good housekeeping and equipment maintenance.
- Wear the proper personal protective equipment for each of the jobs you do.
- Know how to handle emergencies (fires, spills, personal injury) involving the flammable and combustible liquids you work with.
- Follow the health and safety rules that apply to your job.

Call the CCOHS Inquiries Service at 1-800-263-8276 if you need more information about how to work safely with flammable and combustible liquids.

FURTHER READING

Controlled Products Regulations, (1987) 122 Canada Gazette Part II 551, 1987 12 31.

Flammable and combustible liquids code: NFPA 30. National Fire Protection Association, 1987.

Flammable and combustible liquids code handbook. R.P. Benedetti, editor. 3rd ed. Quincy, Massachusetts: National Fire Protection Association, 1987.

Flammable and combustible liquids in small containers. Rev. 84. (Data sheet, 1-532) Chicago, Illinois: National Safety Council, 1984.

FPA guide to safe practice with flammable liquids. Fire Prevention. No. 114 (1976) p. 23-30.

National fire code of Canada. 5th ed. Ottawa: National Research Council of Canada, 1985.

Working safely with flammable and combustible liquids. Cincinnati, Ohio: National Institute for Occupational Safety and Health, 1978.